UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
WASHINGTON OPERATIONS OFFICE
300 Desmond Drive SE, Suite 102
Lacey, Washington 98503

August 19, 1998

Greg Pratschner
U.S. Fish and Wildlife Service
12790 Fish Hatchery Road
Leavenworth, WA 98826

Dear Mr. Pratschner:

I am following up my visit to your facility with this reiteration of our discussion of August 11, 1998. At that time, I suggested you have an engineer, or person of your choice, determine how to clean the west bank of Icicle Creek of fish waste which washed out of your pollution abatement pond on July 29, 1998.

This waste should be cleaned up immediately, with a followup letter to our office acknowledging that the work has been completed.

Thank you for your attention to the matter.

Sincerely,

Dennis Lazzar,
NPDES Inspector

United States Environmental Protection Agency
Washington, D.C. 20460

Water Compliance Inspection Report

Form Approved.
OMB No. 2040-0057
Approval expires 8-31-98

Section A: National Data System Coding (i.e., PCS)

Transaction Code	NPDES	yr/mo/day	Inspection Type	Inspector	Fac Type
1 [ ] 2 [5]	3 [WA0001902] 11	12 [980811] 17	18 [C]	19 [R]	20 [4]

Remarks
21 [ ] 66

Inspection Work Days	Facility Self-Monitoring Evaluation Rating	B1	QA	Reserved
67 [ ] 69	70 [2]	71 [ ]	72 [ ]	73 [ ] 74 75 [ ] 80

Section B: Facility Data

Name and Location of Facility Inspected *(For industrial users discharging to POTW, also include POTW name and NPDES permit number)*

U.S. FISH AND WILDLIFE SERVICE
LEVENWORTH NFH COMPLEX
12790 FISH HATCHERY ROAD
LEVENWORTH, WA. 98826

Entry Time/Date: 2:00 PM 8-11-98

Permit Effective Date: 1-30-75

Exit Time/Date: 5:00 PM 8-11-98

Permit Expiration Date: 1-31-79

Name(s) of On-Site Representative(s)/Title(s)/Phone and Fax Number(s)

GREG PRATSCHNER
COMPLEX MANAGER
(509) 548 7641

Other Facility Data

U.S. EPA Region 10
AUG 21 1998
OFFICE OF WATER

Name, Address of Responsible Official/Title/Phone and Fax Number

SAME AS ABOVE

Contacted: [X] Yes [ ] No

Section C: Areas Evaluated During Inspection *(Check only those areas evaluated)*

[ ] Permit	[ ] Flow Measurement	[X] Operations & Maintenance	[ ] CSO/SSO (Sewer Overflow)
[ ] Records/Reports	[X] Self-Monitoring Program	[X] Sludge Handling/Disposal	[ ] Pollution Prevention
[ ] Facility Site Review	[ ] Compliance Schedules	[ ] Pretreatment	[ ] Multimedia
[X] Effluent/Receiving Waters	[ ] Laboratory	[ ] Storm Water	[ ] Other:

Section D: Summary of Findings/Comments *(Attach additional sheets of narrative and checklists as necessary)*

Facility vacuumes & brushes raceways 1-2x/week. Incubators & raceway effluent sent to pollution abatement pond for seperation (settling) of solids before entering Icicle creek. Stack towers remove N_2 before water enters rearing tanks. Sand settling tank working OK. Pollution abatement pond cleaned every 2 years. On 7/29/98 John Anderson Excavating contracted to clean. All water was not stopped during cleaning thus carrying some sludge out to Icicle creek. Facility was instructed to clean it up.

Name(s) and Signature(s) of Inspector(s)	Agency/Office/Phone and Fax Numbers	Date
Dennis Lazzar DENNIS LAZZAR	EPA/WOO (360) 753 9469	8/19/98
Signature of Management Q A Reviewer	Agency/Office/Phone and Fax Numbers	Date

EPA Form 3560-3 (Rev 9-94) Previous editions are obsolete.

insp 8/25/98 lv

INSTRUCTIONS

Section A: National Data System Coding *(i.e., PCS)*

Column 1: Transaction Code: Use N, C, or D for New, Change, or Delete. All inspections will be *new* unless there is an error in the data entered.

Columns 3-11: NPDES Permit No. Enter the facility's NPDES permit number. *(Use the Remarks columns to record the State permit number, if necessary.)*

Columns 12-17: Inspection Date. Insert the date entry was made into the facility. Use the year/month/day format (e.g., 94/06/30 = June 30, 1994).

Column 18: Inspection Type. Use one of the codes listed below to describe the type of inspection:

- A Performance Audit
- B Compliance Biomonitoring
- C Compliance Evaluation (non-sampling)
- D Diagnostic
- E Corps of Engineers Inspection
- F Pretreatment Follow-up
- G Pretreatment Audit
- I Industrial User (IU) Inspection
- L Enforcement Case Support
- M Multimedia
- P Pretreatment Compliance Inspection
- R Reconnaissance
- S Compliance Sampling
- U IU Inspection with Pretreatment Audit
- X Toxics Inspection
- Z Sludge
- 2 IU Sampling Inspection
- 3 IU Non-Sampling Inspection
- 4 IU Toxics Inspection
- 5 IU Sampling Inspection with Pretreatment
- 6 IU Non-Sampling Inspection with Pretreatment
- 7 IU Toxics with Pretreatment

Column 19: Inspector Code. Use one of the codes listed below to describe the *lead agency* in the inspection.

- C — Contractor or Other Inspectors *(Specify in Remarks columns)*
- E — Corps of Engineers
- J — Joint EPA/State Inspectors—EPA Lead
- N — NEIC Inspectors
- R — EPA Regional Inspector
- S — State Inspector
- T — Joint State/EPA Inspectors—State lead

Column 20: Facility Type. Use one of the codes below to describe the facility.

1 — Municipal. Publicly Owned Treatment Works (POTWs) with 1987 Standard Industrial Code (SIC) 4952.
2 — Industrial. Other than municipal, agricultural, and Federal facilities.
3 — Agricultural. Facilities classified with 1987 SIC 0111 to 0971.
4 — Federal. Facilities identified as Federal by the EPA Regional Office.

Columns 21-66: Remarks. These columns are reserved for remarks at the discretion of the Region.

Columns 67-69: Inspection Work Days. Estimate the total work effort (to the nearest 0.1 work day), up to 99.9 days, that were used to complete the inspection and submit a QA reviewed report of findings. This estimate includes the accumulative effort of all participating inspectors; any effort for laboratory analyses, testing, and remote sensing; and the billed payroll time for travel and pre and post inspection preparation. This estimate does not require detailed documentation.

Column 70: Facility Evaluation Rating. Use information gathered during the inspection (regardless of inspection type) to evaluate the quality of the facility self-monitoring program. Grade the program using a scale of 1 to 5 with a score of 5 being used for very reliable self-monitoring programs, 3 being satisfactory, and 1 being used for very unreliable programs.

Column 71: Biomonitoring Information. Enter D for static testing. Enter F for flow through testing. Enter N for no biomonitoring.

Column 72: Quality Assurance Data Inspection. Enter Q if the inspection was conducted as followup on quality assurance sample results. Enter N otherwise.

Columns 73-80: These columns are reserved for regionally defined information.

Section B: Facility Data

This section is self-explanatory except for "Other Facility Data," which may include new information not in the permit or PCS (e.g., new outfalls, names of receiving waters, new ownership, and other updates to the record).

Section C: Areas Evaluated During Inspection

Check only those areas evaluated by marking the appropriate box. Use Section D and additional sheets as necessary. Support the findings, as necessary, in a brief narrative report. Use the headings given on the report form (e.g., Permit, Records/Reports) when discussing the areas evaluated during the inspection. The heading marked "Multimedia" may indicate medias such as CAA, RCRA, and TSCA. The heading marked "Other" may indicate activities such as SPCC, BMPs, and concerns that are not covered elsewhere.

Section D: Summary of Findings/Comments

Briefly summarize the inspection findings. This summary should abstract the pertinent inspection findings, not replace the narrative report. Reference a list of attachments, such as completed checklists taken from the NPDES Compliance Inspection Manuals and pretreatment guidance documents, including effluent data when sampling has been done. Use extra sheets as necessary.

United States Environmental Protection Agency
Washington, D.C. 20460

Water Compliance Inspection Report

Form Approved.
OMB No. 2040-0057
Approval expires 8-31-98

Section A: National Data System Coding (i.e., PCS)

Transaction Code	NPDES	yr/mo/day	Inspection Type	Inspector	Fac Type
1 N	2 5 3 WA0000192 11	12 01/09/18 17	18 C	19 R	20 4

Remarks: Interior, Fish and Wild life

Inspection Work Days	Facility Self-Monitoring Evaluation Rating	B1	QA	Reserved
67 69	70	71	72	73 74 75 80

Section B: Facility Data

Name and Location of Facility Inspected *(For industrial users discharging to POTW, also include POTW name and NPDES permit number)*

Leavenworth National Fish Hatchery
12790 Fish Hatchery Rd
Leavenworth, WA 98826

Entry Time/Date: 9/18/01 10:25 AM

Exit Time/Date: 9/18/01 12:45 pm

Permit Effective Date: 01/30/75

Permit Expiration Date: 08/31/79

Name(s) of On-Site Representative(s)/Title(s)/Phone and Fax Number(s)

DAN Davies Fish Hatchery Manager
Phone: (509) 548-7641
FAX: (509) 548-6263

Other Facility Data: Federal

SIC 0921

(minor)

Name, Address of Responsible Official/Title/Phone and Fax Number

See Above

Contacted: [X] Yes [ ] No

Section C: Areas Evaluated During Inspection *(Check only those areas evaluated)*

[ ] Permit	[X] Flow Measurement	[ ] Operations & Maintenance	[ ] CSO/SSO (Sewer Overflow)
[X] Records/Reports	[ ] Self-Monitoring Program	[X] Sludge Handling/Disposal	[ ] Pollution Prevention
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[ ] Effluent/Receiving Waters	[ ] Laboratory	[ ] Storm Water	[ ] Other:

Section D: Summary of Findings/Comments *(Attach additional sheets of narrative and checklists as necessary)*

See ATTACHED Report

RECEIVED
SEP 19 2001
U.S. EPA REGION 10
OFFICE OF WATER

Name(s) and Signature(s) of Inspector(s)	Agency/Office/Phone and Fax Numbers	Date
M. Gilbertson	US EPA R10 553-6513 FAX 553-8210	9-19-01

Signature of Management Q A Reviewer	Agency/Office/Phone and Fax Numbers	Date

EPA Form 3560-3 (Rev 9-94) Previous editions are obsolete.

PCS 09-19-01 JBrown

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R Reconnaissance
S Compliance Sampling
U IU Inspection with Pretreatment Audit
X Toxics Inspection
Z Sludge
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

Reply To
Attn Of: OEA-095

September 19, 2001

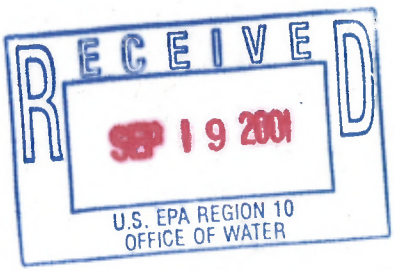
MEMORANDUM

SUBJECT: NPDES Inspection Report for Leavenworth National Fish Hatchery

FROM: M. Eileen Hileman
Investigations and Engineering Unit

THRU: J.J. Brown
NPDES Compliance Unit
EPA Region 10

TO: Bub Loiselle, Manager
NPDES Compliance Unit



Attached is the NPDES CEI inspection report and Form 3560-3 for the above referenced facility. The NPDES Compliance Program requested that the facility be changed from a CSI to a CEI type inspection; therefore no samples were taken during the inspection. The facility is a minor and the permit for the facility has been administratively extended since 1979.

The facility has undergone extensive renovation in the years the permit has been administratively extended. A current schematic of the facility is included in the report. The facility was last inspected in 1998 by Dennis Lazaar. Mr. Lazaar noted that the pollution abatement pond was being cleaned during the inspection and that some sludge/sediment was being discharged to Icicle Creek. The pond has not undergone cleaning since that time, though it is scheduled for cleaning in 2002. The facility will insure that their contractor follows proper procedures to insure that no sediment or sludge is released to Icicle Creek during the cleaning.

If you have questions or concerns regarding this inspection, please feel free to call me at 3-6513.

NPDES INSPECTION
DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE
LEAVENWORTH NATIONAL FISH HATCHERY
LEAVENWORTH, WASHINGTON

FACILITY:	Department of the Interior U.S. Fish and Wildlife Service Leavenworth National Fish Hatchery 12790 Fish Hatchery Road Leavenworth, Washington 98826
MAILING ADDRESS:	P.O. Box 549 Leavenworth, Washington 98826
FACILITY CONTACTS:	Dan Davies Fish Hatchery Manager U.S. Fish and Wildlife Service Phone: (509) 548-7641 Fax: (509) 548-6263 Julie A. Collins Supervisory Fishery Biologist Phone: (509) 548-7641 Fax: (509) 548-6263
FACILITY OPERATOR:	U.S. Fish and Wildlife Service
FACILITY OWNER:	U.S. Fish and Wildlife Service
NPDES PERMIT NO:	WA-000190-2 **Issued**: January 30, 1975 **Expired**: August 31, 1979 Permit is administratively extended
FACILITY CLASS:	Minor
DATE OF INSPECTION:	September 18, 2001 **Arrival** 10:25 a.m **Exit** 12:45 p.m.
DATE OF REPORT:	September 19, 2001
INSPECTORS:	M. Eileen Hileman, Inspector Investigations and Engineering Unit EPA Region 10

BACKGROUND

When Grand Coulee Dam was built on the Columbia River in the 1930s, salmon migration above the dam was brought to an abrupt halt. Due to this loss of hundreds of miles of salmon spawning habitat, the federal government built and began operating fish hatcheries to help salmon of the Columbia River system.

The Leavenworth hatchery has been in operation since 1940 and currently raises and releases 1.6 million juvenile spring chinook salmon annually into Icicle Creek. The hatchery is located in the town of Leavenworth and discharges to Icicle Creek. Icicle Creek has been determined to be an Endangered Species Creek for Bull Trout.

ENTRY AND FILE REVIEW

I entered the facility at 10:25 a.m. and presented credentials to the Receptionist and requested to speak to the Hatchery Manager. I was met by Dan Davies, Hatchery Manager, Julie Collins, Supervisory Fishery Biologist, and Greg Pratschner, Complex Manager. I explained the nature of the inspection to those present and presented my credentials. After an initial in briefing, I requested a schematic of the hatchery operation. The schematic is appended to this inspection report as Attachment I. The facility's permit has been administratively extended since 1979. Since that time the facility has undergone a number of structural changes. The original raceways are no longer in use and have been replaced over the years by other raceways. The facility is required to sample for Suspended Solids once per month and for Setteable Solids once per week during cleaning and twice per month during non-cleaning. A review of the facility's DMRs show no violations over the past several years.

FACILITY DESIGN AND OPERATION

The facility draws its intake water from Icicle Creek and from seven wells for which the hatchery has water rights. Due to heavy sand, the facility utilizes a sand trap and screen chamber to settle out the sand and debris prior to directing the inflow through the facility.

The facility's original raceways have been abandoned in place. New construction started in 1979 and is ongoing as improvements are made and the facility continues to upgrade. Currently there are forty-five 8x80 raceways; fourteen 10x100 raceways and two 15x150 adult holding ponds. All are made of concrete. In approximately 1994 a pollution abatement pond was built. All raceways (including storm water from the abandoned raceways) drain to the abatement pond during cleaning (see schematic, Attachment I). The abatement pond is normally cleaned approximately every two years. The last time the pond was cleaned was in 1998 during the visit by Dennis Lazaar, EPA Region 10 inspector. The facility plans to clean the pond again in 2002. The pond was designed to allow for hatchery expansion and there was very little buildup at the time of this inspection.

According to facility personnel, raceways are cleaned one to two times per week or as often as necessary. Cleaning is done by both brush and vacuum. The facility keeps a cleaning chart that records the date the area is cleaned by placing a checkmark in a box. Appended to this

inspection report as Attachment II is a copy of the last three months cleaning charts. Each quiescent zone has a waste water drain line connected to the pollution abatement pond. When raceways are not being cleaned, raceway water discharges directly to Icicle Creek.

The pollution abatement pond handles the wastes from all the raceways. The pollution abatement pond is constructed of concrete and according to facility personnel, is cleaned approximately every two years. According to facility personnel, the pond is larger than what is needed for the hatchery at this time, therefore buildup is slow. Sludges (which consist mostly of sand) are removed to an area on the property that is away from the creek.

Production at the Leavenworth Hatchery is approximately 1.6 juvenile spring chinook salmon which are released into Icicle Creek on an annual basis.

According to Mr. Davies, all drugs, disinfectants and chemicals used at the facility are done so in manner consistent with label directions. The facility uses the following drugs, disinfectants, and other chemicals:

Name	**Total Amount Used in 2000**
Formalin	1155 gallons
Finquil (MS222)	1.0 KG
Iodophor	30 gallons
Benzal Konium Chloride	30 gallons

Appended to this inspection report as Attachment III are the MSDS sheets for each and the Health Summary for 2000 that were provided by Hatchery personnel

The facility has two effluent discharge sampling points - the discharge from the pollution abatement pond and the discharge from the fish ladder. The facility also samples the intake water. The facility does grab sampling Sampling is not based on flow.

BEST MANAGEMENT PLAN/QUALITY ASSURANCE PLAN/ANNUAL REPORTS

The current administratively extended permit does not require development of a BMP or Quality Assurance Plan. The facility does not prepare an Annual Report.

DISCHARGE MONITORING REPORTS & SAMPLE COLLECTION PROCEDURES

The permit requires the following monitoring and reporting:

Parameter	**Discharge Limitation**			**Monitoring Requirements**	**Type**
	Daily Avg.	**Daily Max.**	**Inst. Max.**		
Total Discharge					
Flow:	**N/A**	**N/A**	**N/A**	**Daily**	**Total**
Suspended Solids				**2x mon**	**Comp.**
kg/day	**831**	**1087**			

(lb/day)	(1832)	(2396)			
Cleaning Effluent					
Setteable Solids ml/l	**N/A**	**N/A**	**2.2**	**1/Week**	**Grab**
Non-cleaning Effluent					
Setteable Solids ml/l	**N/A**	**N/A**	**0.2**	**2/Month**	**Grab**

Reports on all parameters are submitted quarterly on the DMR and sent to EPA.

A review of the DMRs did not reveal any permit violations.

FLOW MEASUREMENT

The facility has experimented with different ways/methods of measuring flow. After reviewing all of the data they facility now monitors flow by lowering the water in the raceways fifteen inches, allowing it to rise three inches and then monitoring the time it takes for the water to raise an additional six inches. The facility then calculates flow based on volumetric method evaluations for the raceways. A copy of the equations are appended to this inspection report as Attachment IV.

ADDITIONAL MONITORING

The Hatchery has not conducted any additional monitoring or studies of its effluent. However, Mr. Davies did provide me with copies of a 1991 Water Quantity and Quality Data Report for the Source Water to Leavenworth Fish Hatchery and a June 2001 draft EIS for the Icicle Creek Restoration Project. Both documents contain substantial information on the water quality of Icicle Creek. These documents are appended to this inspection report as Attachment V.

FACILITY INSPECTION

Accompanied by Mr. Davies, we walked through the facility. Photographs one through three show the Hatch building nursery. The building contains 108 fiberglass tanks and 63 troughs (photographs one through three). After late-August spawning in the hatchery, fertilized eggs are incubated in buckets and trays (photograph four) until they hatch in October. Well water is pumped through the trays containing the eggs providing oxygen to the developing fish. After the fry hatch and have consumed their yolks they are moved to the fiberglass tanks and feed commercial fish food until they are moved to the larger outdoor raceways in approximately February.

We then moved to the area of the abandoned raceways (photographs five and six). These are the raceways that were in place at the time the current administratively extended permit was issued. The raceways are abandoned in place. However, piping is such that all storm water would be routed to the pollution abatement pond prior to discharge.

We then walked over to the raceways that were built in 1998. At the time of the inspection, the hatchery was dealing with a parasite issue and using Formalin in these raceways to combat it. The discharge during this treatment process is routed through the pollution abatement pond. The raceways are cleaned one to two times per week or as needed using both brushes and vacuum. At the time of the inspection there was no build up of debris in the raceways or the quiescent zones.

Photographs eight and nine show the raceways that were built in 1979. These raceways are also cleaned one to two times per week or as needed.

We then walked over to the sand trap that filters sand from the influent from Icicle Creek. Photographs ten and eleven show the sand trap and the sand from the trap that is removed and piled in an area away from the creek.

The adult rearing ponds (photograph twelve) were empty at the time of the inspection.

Photograph thirteen shows the fish ladder discharge into Icicle Creek.

We then walked over to the pollution abatement pond (photograph fourteen). At the time of the inspection, facility personnel informed the inspector that all raceways were piped to the pollution abatement pond for discharge during cleaning events. Normally the pond is cleaned every two years but according to facility personnel, the last time the pond was cleaned was in 1998 at the time of the previous EPA inspection. The pond is oversized for the hatchery's needs and buildup occurs very slowly. Photograph fifteen shows the amount of sand removed from the 1998 cleaning. Photograph sixteen shows the discharge from the abatement pond into the canal that leads to the creek. Photograph seventeen shows the discharge from the canal into the creek.

SAMPLING

The NPDES Program did not request samples during this inspection; therefore no samples were taken.

OUT BRIEFING

We returned to the office, where Mr. Davies made copies of the documents I had requested. Appended to this inspection report as Attachment VI are the production summaries for FY2000. I provided Mr. Davies with the names and phone numbers of the NPDES Compliance and Permit staff that could answer his questions concerning issuance of a new permit. After obtaining the requested documentation, I thanked all present for their time and cooperation and left the facility at 12:45 p.m.

ATTACHMENTS

1. Hatchery Schematic

2. Raceway Cleaning Records

3. 2000 Chemical Summary and MSDS

4. Flow Equations and Well information

5. 1991 Water Quantity and Quality Data for Source Water & 6/2000 EIS

6. Hatchery Production Summary

7. Photographs

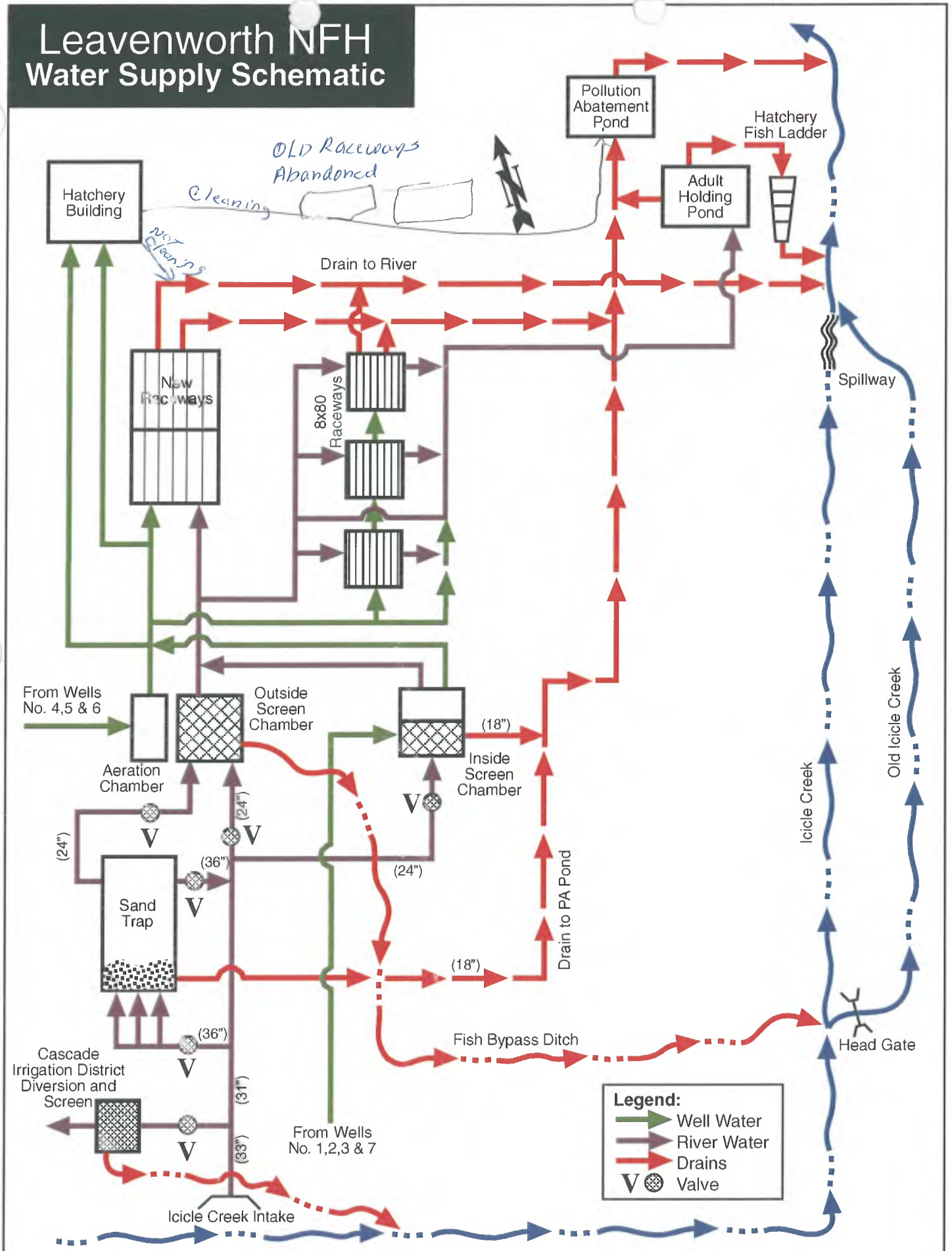
September 19, 2001
DATE REPORT SUBMITTED

M. Eileen Hileman
INSPECTOR'S SIGNATURE

ATT I

ATT 2

Leavenworth NFH
Water Supply Schematic



Note: Only valves located on river water pipe lines to which downstream migrating fish are exposed are shown. **Figure 3.3**

W3x30303/1000/600disc/610study/NFHWaterSup.fh8

ATTL

PONDS TO CLEAN

Date	Upper RWY	Middle RWY	Lower RWY	Fl # 1	Fl # 2	Fl # 3	Adult Pond	N. Nursery	S. Nursery
May 1		✓				3+4			
May 2	✓					✓			
May 4									
		✓							
6	✓					✓			
7									
8		✓							
9			1				1		
10	✓								
11				✓					
12			✓			✓			
13									
14		✓							
15	✓					✓			
16									
17			✓	✓					
18		✓							
19									
20	✓					✓			
21									
22				✓					
23			✓						
24		✓							
25	✓								
26				✓		✓			
27			41 - 47 ✓						
28			48 - 55						
29	✓	✓							
30	✓								
31						✓			
June 1				✓					
2			✓						
3	✓	✓							
4	✓					✓			
5									
6				✓					
7									
8		✓	✓						
9		✓							
10	✓					✓			
11									
12				✓					
13			✓						
14		✓							
15	✓					✓			
16									
17				✓					
18			✓						
19		✓							
20	✓								
21						✓			
22				✓					
23			✓						
24									
25		✓							

PONDS TO CLEAN

Date	Upper RWY	Middle RWY	Lower RWY	Fl #1 40x100	Fl #2	Fl #3 40x100	Adult Pond	N. Nursery	S. Nursery
June 26	✓						✓		
27						✓			
28			✓						
30		✓							
July 1	✓								
2				✓					
3						✓			
4			✓						
5		✓							
6	✓								
7				✓					
8						✓			
9									
10									
11			✓						
12									
13	✓								
14				✓					
15						✓			
17		✓	✓						
18	✓								
19				✓					
20						✓			
21			✓						
22									
23		✓							
24	✓			✓					
25			✓			✓			
26			✓						
27		✓							
28	✓			✓					
29						✓			
30			✓	✓					
31		✓				✓			
1	✓								
2			✓	✓					
3		✓				✓			
4									
5			1 acre						
6	✓								
7				✓		✓			
8			✓						
9		✓							
10	✓								
11						✓			
12				✓					
13			✓						
14									
15	✓	✓							
16	✓								
18				✓					
19						✓			

PONDS TO CLEAN

ate 2001	Upper RWY	Middle RWY	Lower RWY	Fl # 1	Fl # 2	Fl # 3	Adult Pond	N. Nursery	S. Nursery
July 20									
21									
22									
23						✓			
24			✓						
25									
26			1				1		
27	✓								
28		✓	✓			✓			
29									
30									
31									
Aug 1									
2									
3	✓	✓	✓	✓		✓			
4									
5									
6									
7	✓	✓	✓						
8									
9									
10									
11									
12	✓	✓	✓	✓		✓			
13									
14	✓	✓							
15	✓	✓		✓		✓			
16			✓						
17									
18									

ATT III

FISH HEALTH ACTIVITIES SUMMARY
NATIONAL FISH HATCHERY

Station: Leavenworth NFH

Fiscal Year: 2000

Problem/Incident/Activity 1	Species 2	Therapeutic Treatment 3	Results / Comments 4
BKD PREVENTION	SCS-BROOKSTOCK	ERYTHROMYCIN (INAD)	SUCCESSFUL
MYCOSIS	SCS-BROODSTOCK	FORMALIN AT 200 PPM	SUCCESSFUL
MYCOSIS	SCS-EGGS	FORMALIN AT 1667 PPM	SUCCESSFUL
BKD PREVENTION	SCS-FINGERLINGS	ERYTHROMYCIN (INAD)	AQUAMYCIN 100 21 DAYS MODERATELY SUCCESSFUL

Chemical Summary:

Chemical	Purpose	Total Used	Total Cost
FORMALIN	MYCOSIS	1155 GALLONS	4,263
FINQUIL (MS222)	ANESTHETIC	1.0 KG	400
IODOPHOR	DISINFECTANT	30GALLONS	420
BENZAL KONIUM CHLORIDE	DISINFECTANT	30GALLONS	450

Form 3-108 (Rev. 1/89)

WA AND LABOR STANDARDS ADMINISTRATI
Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME: Western Chemical, Inc.	EMERGENCY TELEPHONE NO.: (206)384-5898
ADDRESS (Number, Street, City, State, and ZIP Code): 1269 Lattimore Rd. Ferndale, Wash. 98248	
CHEMICAL NAME AND SYNONYMS: Polymeric Iodine	TRADE NAME AND SYNONYMS: Iodine, PVP
CHEMICAL FAMILY: PVP Iodine Complex	FORMULA: N/A

SECTION II—HAZARDOUS INGREDIENTS

PAINTS PRESERVATIVES AND SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
THERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III—PHYSICAL DATA

BOILING POINT (°F.)	approx.	130 c	SPECIFIC GRAVITY (H_2O=1)	1.10
VAPOR PRESSURE (mmHg.)		N/A	PERCENT VOLATILE BY VOLUME (%)	NA
VAPOR DENSITY AIR=1)		N/A	EVAPORATION RATE (Ether .....=1)	Slower
SOLUBILITY IN WATER		100		
APPEARANCE AND ODOR		Black liquid		

SECTION IV—FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used): None	FLAMMABLE LIMITS	Lel: UK	Uel: UK
EXTINGUISHING MEDIA: N/A			
SPECIAL FIRE FIGHTING PROCEDURES: N/A			
UNUSUAL FIRE AND EXPLOSION HAZARDS: N/A			

Iodine, PVP (Conta)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	UK
EFFECTS OF OVEREXPOSURE	Possible skin and eye irritation
EMERGENCY AND FIRST AID PROCEDURES	Skin - wash with soap & water. Eyes - flush with plenty of water. Consult physician. Internal - give large amounts of milk or water. Call physician immediately.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATABILITY *(Materials to avoid)*			
HAZARDOUS DECOMPOSITION PRODUCTS	Iodine Vapors		
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Flush with water
WASTE DISPOSAL METHOD
Flush neutralized waste down drain or pick up with absorbent.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*	N/A	
VENTILATION	LOCAL EXHAUST: If available, if not open	SPECIAL: N/A
	MECHANICAL *(General)*: doors or windows	OTHER
PROTECTIVE GLOVES: rubber	EYE PROTECTION: protective goggles	
OTHER PROTECTIVE EQUIPMENT: as needed		

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Store away from heat. Mix only as directed. Do not reuse empty container.
OTHER PRECAUTIONS: Harmful if swallowed. Keep out of reach of children.

WAGE AND LABOR STANDARDS ADMINISTRATION
Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

Hymine

SECTION I

MANUFACTURER'S NAME: Western Chemical, Inc.	EMERGENCY TELEPHONE NO.: (206)384-5898
ADDRESS (Number, Street, City, State, and ZIP Code): 1269 Lattimore Rd. Ferndale, Wash. 98248	
CHEMICAL NAME AND SYNONYMS: Dialkyl, Dimethyl Ammonium Chloride	TRADE NAME AND SYNONYMS: WESTERN QUAT
CHEMICAL FAMILY: Quaternary ammonium (Sanitizer)	FORMULA: [C2p H44-N]+CL-

SECTION II—HAZARDOUS INGREDIENTS

PAINTS PRESERVATIVES AND SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
uaternary	10	N/A
ethanol	1	1000 ppm

SECTION III—PHYSICAL DATA

BOILING POINT (°F.) approx.	UK	SPECIFIC GRAVITY (H_2O=1)	1,000
VAPOR PRESSURE (mmHg.)	N/A	PERCENT VOLATILE BY Weight (%)	10
VAPOR DENSITY AIR=1)	N/A	EVAPORATION RATE (Ether =1)	N/A
SOLUBILITY IN WATER	complete		
APPEARANCE AND ODOR	Colorless liquid - ethanolic odor		

SECTION IV—FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used)	FLAMMABLE LIMITS	Lel	Uel
N/A		UK	UK

EXTINGUISHING MEDIA: Water

SPECIAL FIRE FIGHTING PROCEDURES: Wear MSHA/NIOSH approved self contained breathing apparatus

UNUSUAL FIRE AND EXPLOSION HAZARDS: Products of combustion are toxic. Heated solvent vapors can travel to an ignition source & flash back.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: 1,000 ppm (ethanol)

EFFECTS OF OVEREXPOSURE

Possible skin and eye irritation

EMERGENCY AND FIRST AID PROCEDURES

Skin - wash with soap & water. Eyes - flush with plenty of water. Consult physician. Internal - give large amounts of milk or water. Call physician immediately. Probable mucosal damage.

SECTION VI - REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	X	N/A

INCOMPATABILITY *(Materials to avoid)*

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon dioxide, carbon monoxide, ammonia, nitrous oxides, hydrogen chlori

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	N/A

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Contain spill & pickup with absorbant and place in containers.

WASTE DISPOSAL METHOD

Contain spill, pickup with an absorbant and properly dispose of at a hazardous incineration facility.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*: Not required

VENTILATION		
	LOCAL EXHAUST: If available, if not open	SPECIAL
	MECHANICAL *(General)*: doors or windows	OTHER

PROTECTIVE GLOVES: rubber

EYE PROTECTION: protective goggles

OTHER PROTECTIVE EQUIPMENT: Face shield

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Store away from heat. Mix only as directed. Do not reuse empty container.

OTHER PRECAUTIONS

Harmful if swallowed. Keep out of reach of children.

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List)
BINQUEL

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that

Section I

Manufacturer's Name ARGENT CHEMICAL LABORATORIES,INC.	Emergency Telephone Number (206) 885-3777
Address (Number, Street, City, State, and ZIP Code) 8702 152nd Ave. N.E.	Telephone Number for Information (206) 885-3777
Redmond, WA 98052	Date Prepared 8/18/88
	Signature of Preparer (optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity, Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
nzoic acid,3-Amino-,Ethyl Ester, Methanesulfonate	NA	NA	NA	

IVN - MUS LD_{50}: 180 mg/kg

IPN-FRG LD_{50}: 250 mg/kg

May be harmful by inhalation, ingestion, or skin absorption.

May cause irritation.

RTECS #DG2455000 CAS # 886-86-2

Section III — Physical/Chemical Characteristics

Boiling Point	NA	Specific Gravity (H_2O = 1)	NA
Vapor Pressure (mm Hg)	NA	Melting Point	148°C
Vapor Density (AIR = 1)	NA	Evaporation Rate (Butyl Acetate = 1)	NA

Solubility in Water: 1 g/0.8 mls at 20°C

Appearance and Odor: White powder with slight to no odor.

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
NA	NA		

Extinguishing Media: Water spray, Carbon Dioxide, Dry Chemical, Alcohol or Polymer Foam

Special Fire Fighting Procedures: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Unusual Fire and Explosion Hazards: Emits toxic fumes under fire conditions-nitrogen oxides, sulfer oxides, carbon monoxide, [illegible] oxide

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List)
FINQUEL

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that

Section I

Manufacturer's Name ARGENT CHEMICAL LABORATORIES, INC.	Emergency Telephone Number (206) 885-3777
Address (Number, Street, City, State, and ZIP Code) 8702 152nd Ave. N.E.	Telephone Number for Information (206) 885-3777
Redmond, WA 98052	Date Prepared 8/18/88
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Hazardous Components (Specific Chemical Identity, Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
nzoic acid,3-Amino-,Ethyl Ester, Methanesulfonate	NA	NA	NA	

IVN - MUS LD_{50}: 180 mg/kg

IPN-FRG LD_{50}: 250 mg/kg

May be harmful by inhalation, ingestion, or skin absorption.

May cause irritation.

RTE #DG2455000 CAS # 886-86-2

Section III — Physical/Chemical Characteristics

Boiling Point	NA	Specific Gravity (H_2O = 1)	NA
Vapor Pressure (mm Hg.)	NA	Melting Point	148°C
Vapor Density (AIR = 1)	NA	Evaporation Rate (Butyl Acetate = 1)	NA

Solubility in Water: 1 g/0.8 mls at 20°C

Appearance and Odor: White powder with slight to no odor.

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
NA	NA		

Extinguishing Media
Water spray, Carbon Dioxide, Dry Chemical, Alcohol or Polymer Foam

Special Fire Fighting Procedures
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Unusual Fire and Explosion Hazards
Emits toxic fumes under fire conditions-nitrogen oxides, sulfer oxides, carbon monoxide.

MATERIAL SAFETY DATA SHEET

FOR INDUSTRIAL USE ONLY

1. Chemical Product and Company Identification

DESCRIPTION: Parasite-S
PRODUCT CODE: 04-FORMA-.
PRODUCT TYPE: Formalin for Aquaculture
APPLICATION: Formalin for Western Chemical

Manufacturer/Supplier Information

MSDS Prepared by:
Borden Chemical, Inc.
155 West A Street, Bldg. A-1
Springfield, OR 97477

Emergency Phone Number
Poison Control Center
1-800-228-5635 ext 261

For additional health, safety or regulatory information, call 541-744-3256.

2. Composition, Information on Ingredients

The ingredients listed below have been associated with one or more immediate and/or delayed(*) health hazards. Risk of damage and effects depends upon duration and level of exposure. BEFORE USING, HANDLING, OR EXPOSURE TO THESE INGREDIENTS, READ AND UNDERSTAND THE MSDS.

		% by weight
50-00-0	*Formaldehyde	30-50
67-56-1	*Methanol	10-30

3. Hazards Identification

3.1 Emergency Overview

Appearance	Clear liquid
Odor	Pungent

COMBUSTIBLE
Harmful if inhaled.
Can cause central nervous system depression.
Causes chemical burns to eyes.
May be harmful if absorbed through skin.
Skin irritant.
North American Emergency Response Guidebook No: 132

HMIS Rating

HEALTH = 3 (serious)
FLAMMABILITY = 2 (moderate)
REACTIVITY = 1 (slight)
CHRONIC = *

3.2 Potential Health Effects

Immediate Hazards

INGESTION: May be harmful if swallowed.
If accidently swallowed, burns or irritation to mucous membranes, esophagus or GI tract can result.
Ingestion may cause blindness.
Can cause central nervous system depression.

INHALATION: Harmful if inhaled.
Can cause irritation of nose, throat and lungs.
Can cause central nervous system depression.

SKIN May be harmful if absorbed through skin. Causes irritation.

EYES: Causes chemical burns.

Methanol 67-56-1
Can cause central nervous system depression. Signs and symptoms may include headache, dizziness, nausea, vomiting, unconsciousness and asphyxiation. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Delayed Hazards

Formaldehyde 50-00-0
POTENTIAL CANCER HAZARD.
Rats chronically exposed to 14 ppm formaldehyde contracted nasal cancers. Based on animal data and limited epidemiological evidence, NTP and IARC have listed formaldehyde as a probable human carcinogen. OSHA regulates formaldehyde as a potential human carcinogen.

May cause allergic skin reaction. Some reports suggest that formaldehyde may cause respiratory sensitization, such as asthma, and that pre-existing respiratory and skin disorders may be aggravated by exposure.

OSHA has identified 0.5 ppm as the "Action Level", 29CFR 1910.1048. Please refer to the OSHA Standard for guidance applicable to your specific operations.

Methanol 67-56-1

Delayed Hazards

Possible reproductive disorders from prolonged exposure.
May cause lung damage based on animal data. Pre-existing respiratory disorders may be aggravated by exposure.
May cause liver damage based on animal data.
May cause kidney damage based on animal data.
May cause blindness if swallowed.
-- See Footnote C.

Footnote C: As of the date of issuance of this document, this material has not been listed by NTP, classified by IARC nor regulated by OSHA as a carcinogen.

4. First Aid Measures

INGESTION: If accidently swallowed, dilute by drinking large quantities of water. Immediately contact poison control center or hospital emergency room for any other additional treatment directions.

INHALATION: If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Get medical attention immediately.

SKIN: Immediately remove all contaminated clothing, including shoes. Wash the affected area of the body with soap or mild detergent and large quantities of water for at least 20 minutes. Contact a physician if irritation persists. If there are chemical burns, cover the area with sterile, dry dressings and get medical attention immediately.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes. Eyelids should be held apart during irrigation to insure water contact with entire surface of eyes and lids. Get medical attention immediately.

5. Fire Fighting Measures

Flash point	61.1C (142F) Setaflash (ASTM D3278)
Lower explosion limit	~7%
Upper explosion limit	~70%
Autoignition temperature	~420C

COMBUSTIBLE.
Keep away from heat and flame.
In case of fire, use water spray, dry chemical, "alcohol" foam or CO2. Use water to keep fire-exposed containers cool.

6. Accidental Release Measures

Always wear appropriate protective equipment. Eliminate all ignition sources and ventilate the area to reduce the potential for exposure, fire and explosion. Recover and reuse as much liquid as possible. Large quantities: Enclose with diking material to prevent seepage into sewer systems, surface/ground water or natural bodies of water. If possible neutralize with dilute(<5%) solutions of ammonium hydroxide, sodium hydroxide, sodium bisulfite or sodium sulfite. Small quantities: Soak up with absorbent material (vermiculite, dry sand, earth) and remove to a chemical disposal area. Follow all emergency notification and reporting regulations.

7. Handling and Storage

7.1 Handling

Handle in accordance with good industrial hygiene and safety practices. These practices include avoiding unnecessary exposure and removal of the material from eyes, skin and clothing.
Wash thoroughly after handling.
INHALATION: Do not breathe vapor. Use with adequate ventilation.
SKIN: Avoid contact with skin and clothing.
EYES: Do not get in eyes.

7.2 Storage

Storage temperature depends on methanol content and should be controlled to avoid precipitation or vaporization. See technical bulletin for recommended storage temperatures. Remove plug slowly to relieve pressure.
Formaldehyde solutions will start to precipitate paraformaldehyde if stored below their recommended storage temperatures making the freezing point difficult to determine.

8. Exposure Controls/Personal Protection

8.1 Exposure Controls

ENGINEERING CONTROLS: The following exposure control techniques may be used to effectively minimize employee exposure: local exhaust ventilation, enclosed system design, process isolation and remote control in combination with appropriate use of personal protective equipment and prudent work practices. These techniques may not necessarily address all issues pertaining to your operations. We, therefore, recommend that you consult with experts of your choice to determine whether or not your programs are adequate.
If airborne contaminants are generated when the material is heated or handled, sufficient ventilation in volume and air flow patterns should be provided to keep air contaminant concentration levels below acceptable criteria.

8.2 Personal Protection

Where air contaminants can exceed acceptable criteria, use NIOSH/MSHA approved full facepiece respiratory protection equipment. Respirators should be selected based on the form and concentration of contaminants in air in accordance with OSHA 29CFR 1910.1048(g) Respiratory Protection, OSHA 29CFR 1910.134 or other applicable standards or guidelines, including ANSI standards regarding respiratory protection. Wear chemical splash goggles or some other type of complete protection for the eye if contact is likely. Wear protective (impervious) gloves as required to prevent skin contact. Where high concentrations of hazardous ingredients may be present, such as in an emergency, full body protection should be worn.

Other protective equipment: Eye wash fountain, safety shower. Reusable protective clothing should be cleaned and ventilated after any formaldehyde contamination.

See OSHA 29CFR 1910.1048(h) Protective Equipment and Clothing and OSHA 29CFR 1910.1048(i) Hygiene Protection for other specific requirements based on the form of formaldehyde, the conditions of use and the hazards to be prevented.

8.3 Exposure Guidelines

Formaldehyde 50-00-0
ACGIH TLV: 0.3 ppm (0.37 mg/m³) Ceiling
OSHA PEL: 0.75 ppm(0.9 mg/m³) TWA; 2 ppm(2.5mg/m³)15min STEL

Methanol 67-56-1
ACGIH TLV: Skin- 200 ppm (262 mg/m³) TWA; 250 ppm (328 mg/m³) STEL
OSHA PEL: 200 ppm (260 mg/m³) TWA
REMANDED PEL: Skin- 200 ppm (260 mg/m³) TWA; 250 ppm (310 mg/m³) STEL
OSHA 1989 PEL remanded, but in effect in some states

9. Physical and Chemical Properties

Appearance	Clear liquid
Color	Colorless
Odor	Pungent
Odor threshold	Not available
Specific gravity	~1.08
pH	Not available
Freezing point	See storage section
Solubility in water	Infinite
Octanol/water partition coefficient	Not available
Vapor pressure @ 25 C	~40 mm Hg
Vapor density (air=1)	~1
Evaporation rate (butyl acetate=1)	Similar to water
Boiling point, 760 mm Hg	~100C

10. Stability and Reactivity

Normally stable, but may further react at high temperatures to form methanol, formic acid or methylals. At low temperatures will self-polymerize to form paraformaldehyde.

Incompatibilities:

Reacts with many compounds. Reaction with phenol, strong acids or alkalis may be violent. Reaction with hydrochloric acid may form bis-chloromethyl ether, an OSHA regulated carcinogen.

Decomposition products may include:

CO, CO2.

Hazardous polymerization:

Will not occur.

11. Toxicological Information

See Section 3 Hazards Identification information.
Formaldehyde 50-00-0
LC50: rat=203 mg/m³ (RTECS)
LD50: orl-rat=0.8 g/kg (Merck); skn-rbt=0.27 g/kg (Sax)

Methanol 67-56-1
LC50: rat=64000 ppm/4H (Sax)
LD50: orl-rat=5628 mg/kg; skn-rbt=20 g/kg (Sax)

12. Ecological Information

Formaldehyde is highly toxic to algae, protozoa and other unicellular organisms and slightly toxic to fish. In the atmosphere the material is rapidly degraded by photolysis and photooxidation. Formaldehyde is mobile in the soil. In water or soil, formaldehyde is biodegraded in a few days. Experiments performed on a variety of fish and shrimp show no bioconcentration of formaldehyde.

Ecotoxicity:
- Algae (scenedesmus): toxic: 0.3-0.5 mg/l
- Arthropoda (daphnia): toxic: 2 mg/l
- Fish (guppies): TLm = 50-200 mg/l

Environmental Fate:
- BOD5 = 60% of ThOD
  = 0.6-1.07 standard dilution at <260 mg/l

Octanol/Water Partition Coefficient = 0.35 (LKOW)

13. Disposal Considerations

Recover free liquid. Absorb residue and dispose of according to local, state/provincial, and federal requirements.
Empty container: May contain explosive vapors. DO NOT cut, puncture or weld on or nearby.

14. Transport Information

14.1 U.S. Department of Transportation (DOT)

The data provided in this section is for information only and may not be specific to your package size. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

Formaldehyde, Solutions, 8, UN2209, III, RQ
Formaldehyde/Methanol, ERG 132

14.2 Canadian Transportation of Dangerous Goods (TDG)

Formaldehyde Solutions
Class 8 (9.2) UN2209 Pk. Gr. III

15. Regulatory Information (Selected Regulations)

15.1 U.S. Federal Regulations

OSHA Hazard Communication Standard 29CFR1910.1200

This material is a "health hazard" and/or a "physical hazard" as determined when reviewed according to the requirements of the Occupational Safety and Health Administration 29 CFR Part 1910.1200 "Hazard Communication" Standard.

SARA Title III: Section 311/312

Fire hazard
Immediate health hazard
Delayed health hazard

SARA Title III Section 313 and 40 CFR Part 372

This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986, and Subpart C-Supplier Notification Requirement of 40 CFR Part 372.

Formaldehyde	50-00-0	37.00%
Methanol	67-56-1	13.98%

TSCA Section 8(b) Inventory

All reportable chemical substances are listed on the TSCA Inventory. We rely on certifications of compliance from our suppliers for chemical substances not manufactured by Borden.

15.2 Canadian Regulations

Workplace Hazardous Materials Information System (WHMIS)

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulation (CPR) and the MSDS contains all the information required by the CPR.

CLASS D, DIV 1A
CLASS D, DIV 2A, 2B
CLASS B, DIV 3

Canadian Environmental Protection Act (CEPA)

All reportable chemical substances are listed on the Domestic Substances List (DSL) or otherwise comply with CEPA new substance notification requirements.

National Pollutant Release Inventory (NPRI)

This product contains the following chemical(s) subject to the reporting requirements of the Canadian Environmental Protection Act (CEPA) subsection 16(1), National Pollutant Release Inventory.

Formaldehyde	50-00-0	37.00%
Methanol	67-56-1	13.98%

16. Other Information

User's Responsibility

The OSHA Hazard Communication Standard 29CFR 1910.1200 and the Workplace Hazardous Materials Information System (WHMIS) require that the information contained on these sheets be made available to your workers. Educate and train your workers regarding OSHA and WHMIS precautions. Instruct your workers to handle this product properly. Consult with appropriate experts to guard against hazards associated with use of this product and its ingredients.

Disclaimer

SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE, except that the product shall conform to contracted specifications, and that the product does not infringe any valid United States or Canadian patent. No claim of any kind

Disclaimer

shall be greater in amount than the purchase price of the quantity of product in respect of which damages are claimed. In no event shall Seller be liable for incidental or consequential damages, whether Buyer's claim is based on contract, breach of warranty, negligence or otherwise.

CUR ISSUE 23-JAN-98
PREVIOUS ISSUE: 23-JAN-98

ATT IV

ATT. IV

Volumetric Method Equations for Raceways:

Foster-Lucas $Q\ (gpm) = 44{,}880 \frac{\text{rise (inches)}}{\text{time (seconds)}}$

Raceways: $Q\ (gpm) = 23936 \frac{\text{rise (inches)}}{\text{time (seconds)}}$

Adult Ponds: $Q\ (gpm) = 84{,}150 \frac{\text{rise (inches)}}{\text{time (seconds)}}$

NON RACEWAYS $Q\ (gpm) = 29083 \frac{\text{rise (inches)}}{\text{time (seconds)}}$

Date	Troughs ...15 cu. ft No. of Units.....72 Size of Unit..1.3x14x0.86				Tanks.....91 cu. Ft. No of Units.....108 Size of Unit..3.1x14x2.1				New covered Rwys..4000cu. ft. No of Units.....14 Size of Units.....10.0x100.4.0				Adit Pnd 10,125_Cu Ft No. Of Units .....2 Size Of Units.....76x8x2.5				Raceways.....1520 cu ft No of Units.....45 Size of Units.....76x8x2.5				Icicle Creek & Well GPM	Well #1 1060 GPM Well #2 570 GPM	Well #3 410 GPM Well #4 1150 GPM	Well #5 1530 GPM Well #6 1060 GPM Well #7 480 GPM	Icicle River
	Source of Supply	Units and Use	GPM Per Unit	Daily Use GPM	Source of Supply	Units and Use	GPM Per Unit	Daily Use GPM	Source of Supply	Units and Use	GPM Per Unit	Daily Use GPM	Source of Supply	Units and Use	GPM Per Unit	Daily Use GPM	Source of Supply	Units and Use	GPM Per Unit	Daily Use GPM					
1									Upper River Pump	7	1000	7000	Reuse	2	2100	4'200	UP	15	200	3000					
2									River Pump	7	400	2'800					Mid Reuse	15	200	3000	19550			1060	1530 480	16'480
3									Reuse Pump	7	400	2'800					Low	15	450	6750						
4																					19550				OFF	18010
5																										
6																					19550				OFF	18'490
7																										
8																										
9																										
10																										
11																										
12																										
13																										
14																										
15																										
16																										
17																										
18									OFF	OFF	OFF		OFF	OFF	OFF		Lower	OFF	OFF	OFF						
19																	mid	15	200	3000	19550			OFF		18000
20																	up	15	200	3000						
21																										
22																										
23																										
24																										
25																										
26									upper	7	400	2800									8800					9800
27																										
28																										
29																										
30																										
31																										
MAX.																										
MIN.																										
MEAN																										

APRIL 2001

Date	Troughs ...15 cu. ft No. of Units.....72 Size of Unit..1.3x14x0.86				Tanks.....91 cu. Ft. No of Units.....108 Size of Unit..3.1x14x2.1				New covered Rwys..4000cu. ft. No of Units.....14 Size of Units.....10.0x100.4.0				Adit Pnd 10,125_Cu Ft No. Of Units .....2 Size Of Units.....76x8x2.5				Raceways.....1520 cu ft No of Units.....45 Size of Units.....76x8x2.5				Icicle Creek & Well GPM	Well #1 1060 GPM Well #2 570 GPM	Well #3 410 GPM Well #4 1150 GPM	Well #5 1530 GPM Well #6 1060 GPM Well #7 480 GPM	Icicle River
	Source of Supply	Units and Use	GPM Per Unit	Daily Use GPM	Source of Supply	Units and Use	GPM Per Unit	Daily Use GPM	Source of Supply	Units and Use	GPM Per Unit	Daily Use GPM	Source of Supply	Units and Use	GPM Per Unit	Daily Use GPM	Source of Supply	Units and Use	GPM Per Unit	Daily Use GPM					
1									HP	7	500	3500	Well	2	539	1179	HP	15	230	3450	16 16 69				16 16 69
2									10W	7	450	3150					MID	15	163	2445					
3																	LOW	15	163	2445					
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																					16 16 69		1150	480	14 15 39
12																									
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31																									
MAX.																									
MIN.																									
MEAN																									

July 2001

FIGURE 1

LEAVENWORTH NATIONAL FISH HATCHERY
FISH PRODUCTION WATER SUPPLY WELLS

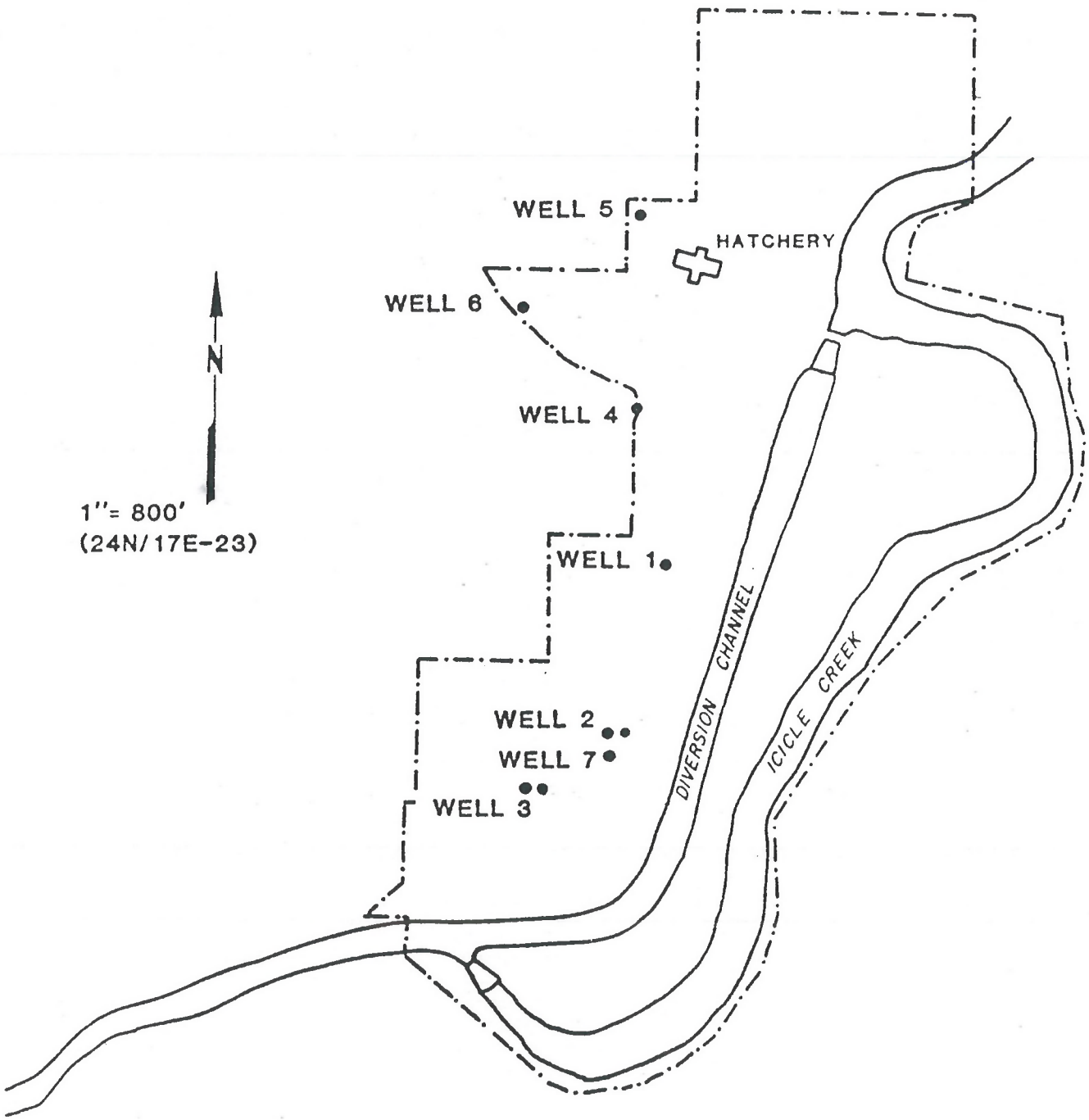

Table 2..--*Summations of discharges in the surface-water flow system*

[ft^3/s, cubic feet per second]

Site 2 plus Site 3		Site 5 plus Site 6 plus Site 7			Site 7 minus Site 8	
Date (1991)	Total available stream discharge (ft^3/s)	Total diverted discharge (ft^3/s)	Percentage of total available discharge diverted	Residual[1] (ft^3/s)	Date	Inflow to hatchery (ft^3/s)
09-04 - 09-06	232	134	58	98	09-05	42.6
09-16 - 09-17	185	134	72	51	09-16	45.2
09-26 - 09-27	138	119	86	19	09-27	41.2
10-02 - 10-03	128	47.4	37	81	10-02	45.2
10-10	108	42.9	40	65	10-10	42.2

[1]Residual is total available discharge minus total diverted discharge, and is comparable to measurements at site 4.

The planned schedule for collecting water samples to determine the quality of water in the streams called for one sampling early in September. Samples for September 4 and 5 were measured on site to determine temperature, pH, specific conductance, and dissolved-oxygen concentrations (table 3). Additional samples on September 4 and 5 were analyzed in the laboratory to determine constituents (table 3) commonly associated with septic wastes, which include nitrate, phosphate, chloride, boron, and MBAS (methylene-blue-active substances) and EDTA (ethylene diamine tetracetic acid), which are indicators of detergents. Samples for bacteria counts and temperature, specific conductance, and pH were collected on September 26-27, 1991 (table 3). No measurable suspended sediment was found in samples collected at the four surface-water sites on September 4-5.

Water temperature of Icicle Creek increased from 12.5 °C at site 1 to 15.5°C at site 4 on September 4-5 and from 9.0°C at site 1 to 14.0°C at site 4 on September 26-27. Specific conductance values were generally low and relatively uniform, ranging from 33-60 µS/cm at all Icicle Creek sites during September 4-5 and September 26. Specific conductance at Snow Creek was 10 µS/cm for both samplings. Likewise, pH values were consistent, ranging from 7.7 to 7.9 standard units in Icicle Creek and 7.0 and 7.4 in Snow Creek. Dissolved-oxygen concentrations were also consistent, ranging from 9.6 to 9.7 mg/L in Icicle Creek and 10.7 mg/L in Snow Creek. The percent saturation of dissolved oxygen in Icicle and Snow Creeks ranged from 98 to 101 on September 4-5, 1991.

Fecal coliform bacteria counts were 3 colonies/100 mL (colonies per 100 milliliters) or less of sample water and fecal streptococci counts ranged from 19 to 53 colonies per 100 mL. None of the bacteria counts are considered to be high. Septic waste indicators were low, mostly at the lower limits of detection.

TABLE 1

U.S. FISH AND WILDLIFE SERVICE
LEAVENWORTH SUPPLY WELLS

WELL	1	2	3	4	5	6	7
SWL	30.7	25.7 (27.5)	26.8	44.4 (44.5)	45.6	49.3	29.5
DATE	6/1/89	6/1/89	6/1/89	8/1/89	8/1/89	8/1/89	6/1/89
PWL	46.6	(68)	39.3	57.8	95.3	78.9	53.6
WR	1200	900	700	800	1600	1200	400
s	15.9	(40.5)	12.5	13.3	49.7	29.6	24.1
Q	1058	581	566	1146	1528	1056	477
Q/s	66.5	14.3	45.2	81	30.7	36	19.8
PUMP INLET	70?	77	75	92	120	103	75
TEMP.	---	---	40	44	49.5	49	---

SWL — STATIC WATER LEVEL in feet below top of casing. Parenthesis indicates airline measurement.

PWL — PUMPING WATER LEVEL in feet below top of casing

Q — Discharge in gallons per minute

s — Pumping drawdown in feet

Q/s — Specific capacity in gallons per minute per foot of drawdown

TEMP. — Temperature in degrees Fahrenheit

NOTE: See text for information on other well tests.

WR (GPM) WATER RIGHT OR Certificate of Application

ATTY

ATT. IV

[redacted]

Water Quantity and Quality Data, September-October 1991, for Source Water to the Leavenworth National Fish Hatchery, Washington

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U.S. GEOLOGICAL SURVEY

Open-File Report 92-93

Prepared in cooperation with

U.S. FISH AND WILDLIFE SERVICE

WATER QUANTITY AND QUALITY DATA, SEPTEMBER-OCTOBER 1991, FOR SOURCE WATER TO THE LEAVENWORTH NATIONAL FISH HATCHERY, WASHINGTON

By Robert E. Drzymkowski and Charles H. Swift, III

U.S. GEOLOGICAL SURVEY

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Prepared in cooperation with

U.S. FISH AND WILDLIFE SERVICE

Tacoma, Washington
1992

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U.S. DEPARTMENT OF THE INTERIOR

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U.S. GEOLOGICAL SURVEY

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purchased from:

U.S. Geological Survey
Books and Open-File Reports Section
Federal Center, Box 25425
Denver, Colorado 80225

CONVERSION FACTORS AND VERTICAL DATUM

Multiply	*By*	*To Obtain*
inch (in)	2.540	centimeter
foot (ft)	0.3048	meter
yard (yd)	0.9144	meter
mile (mi)	1.609	kilometer
square mile (mi^2)	2.590	square kilometer
acre-foot (acre-ft)	1,233	cubic meter
foot per second (ft/s)	0.3048	meter per second
cubic foot per second (ft^3/s)	0.02832	cubic meter per second

Temperature: Air temperatures are given in degrees Fahrenheit (°F), which can be converted to degrees Celsius (°C) by the following equation:

$$°C = 5/9(°F-32)$$

Following convention, water temperatures are given in degrees Celsius, which can be converted to degrees Fahrenheit by the following equation:

$$°F = 1.8(°C) + 32$$

WATER QUANTITY AND QUALITY DATA, SEPTEMBER-OCTOBER 1991, FOR SOURCE WATER TO THE LEAVENWORTH NATIONAL FISH HATCHERY, WASHINGTON

Robert E. Drzymkowski and Charles H. Swift, III

ABSTRACT

Surface-water flow, ground-water levels, and water quality were measured at intervals from September 4 to October 10, 1991, in the vicinity of the Leavenworth National Fish Hatchery near Leavenworth, Washington. The measurements were made to establish baseline data for comparison with future information for streams that supply water to the hatchery, water flow in surface diversions, and water levels and quality of water from wells that supply water to the hatchery. Icicle Creek and its tributary, Snow Creek, are the main sources of water supply for the hatchery, but ground water is at times used to supplement the supply.

For five measurements made from September 4 to October 10, the discharges of Icicle Creek upstream from Snow Creek and upstream from the three diversions decreased from 195 ft^3/s (cubic feet per second) to 76 ft^3/s. The five measured discharges of Snow Creek decreased from 37.5 to 31.8 ft^3/s. The discharges diverted from Icicle Creek upstream from the hatchery ranged from 0 to 83.6 ft^3/s for the five measurements in each of the three diversions. Although inflow to the hatchery is not directly measurable, a summation accounting of the measurements of the inflow from the two streams minus the measured diversion flows indicates that the surface-water discharge available to the hatchery ranged from about 41.2 to 45.2 ft^3/s. Water-quality characteristics of surface water as measured at four stream sites are generally good.

Ground-water levels in one of the two measured wells declined about 1 foot from September 6 through September 27, and then increased about 1 foot by October 10, 1991. Water temperatures were colder (7.5 degrees Celsius) in the shallower measured well than in the deeper measured well, which had temperatures similar to the surface-water sites. Dissolved solids, as indicated by specific conductance, were notably higher in ground water than in Icicle Creek. Other water-quality characteristics for ground water were generally similar to those for Icicle Creek, although the streptococci bacteria counts in water from wells were minimal and lower than in the surface waters.

INTRODUCTION

The U.S. Fish and Wildlife Service (USFWS) operates the Leavenworth National Fish Hatchery near Leavenworth, Washington, where about 2.5 million spring Chinook salmon and smaller numbers of steelhead trout are reared each year. The hatchery depends mainly on Icicle Creek for an adequate supply of good-quality fresh water. The surface-water supply is sometimes supplemented by ground water from local wells during the summer and fall when the flow or temperature of the stream is inadequate for hatchery operation. As an additional supplement, the USFWS can store up to 16,000 acre-ft of water in Snow and Nada Lakes. The stored water can be released through Snow Creek to enhance the flow in Icicle Creek during late summer and early fall.

There are three substantial diversions of water from Icicle Creek within 2 mi upstream from the fish hatchery. One of these is a combined diversion for the hatchery and Cascade Irrigation Canal.

The USFWS is concerned that water supplies available to the hatchery have diminished and water temperatures have increased in recent years. There is also concern that increased development and recreational use of the Icicle Creek drainage may adversely affect the quality and quantity of surface water and ground water available to the hatchery during low-flow periods. These changes could affect the productivity of the fish hatchery. Few data are known to exist that document these concerns and serve as a basis for comparison.

Consequently, the U.S. Geological Survey (USGS) agreed to collect baseline data for water quantity and quality that could be used by the USFWS for comparison with future water-supply conditions. The needed data includes flow and water quality in streams that supply water to the hatchery, water flow in surface diversions, and water levels and quality of water from wells that supply water to the hatchery. Baseline data for low-flow conditions were collected by USGS in cooperation with USFWS in September and October 1991.

Purpose and Scope

The purpose of this report is to present the water quantity and quality data that were collected at selected sites during September-October 1991 . The sites generally were selected to represent streamflow and surface-water diversions, as well as ground-water conditions in the immediate vicinity of the fish hatchery. One surface-water quality site was selected on Icicle Creek about 17 mi upstream from the hatchery to obtain data from relatively pristine surface water.

Description of Study Area

The Icicle Creek study area includes a 2-mile reach of that stream upstream from the fish hatchery at river mile 3, and a single site on Icicle Creek upstream from Black Pine Creek at river mile 20. The study area is on the east slope of the Cascade Range and south of the town of Leavenworth, Washington. The drainage area of Icicle Creek at the mouth, near the hatchery, is 211 mi^2.

The Icicle Creek valley is generally deep and steep sided; mountains on either side rise to altitudes of more than 7,000 ft, including 9,426-ft Mt. Stuart along the southern basin boundary. The slopes are moderately to heavily forested. The hatchery is located on an alluvial floodplain less than 1 mi wide at an altitude of approximately 1,140 ft. The floodplain alluvium extends about 1 mi upstream from the hatchery. Farther upstream, Icicle Creek is closely confined by valley walls and the amount of alluvium is minimal.

Icicle Creek supplies water for the City of Leavenworth, two irrigation districts, and the hatchery. The basin is a popular recreation area that attracts more than 500,000 visitors during the summer season. In addition to an increasing influx of summer visitors, there is also an increase in construction of summer homes in the area upstream from the hatchery and year-round residences that use water in the general vicinity of the hatchery.

Mean annual air temperature at Leavenworth (U.S. Department of Commerce, 1989) is 48.8 °F for a 56-year period of record from 1934-1989; July is the warmest month (mean 70 °F) and January the coldest (mean 25 °F).

Mean annual precipitation at Leavenworth (U.S. Department of Commerce, 1989) is 25.7 inches for a 68-year period of record from 1922-1989. December has the largest mean monthly precipitation (4.6 inches), and most winter precipitation falls as snow. The lowest mean monthly precipitation is July (0.31 inches), and the mean monthly precipitation during the months of August, September, and October is 0.69, 0.77, and 1.8 inches, respectively.

The geology in the study area is a floodplain made up of Quaternary alluvium, a coarse gravel (Tabor and others, 1987). Logs of wells within the hatchery grounds indicate that the thickness of this alluvium is as much as 286 ft.

Selection and Location of Data-Collection Sites

Seven sites were chosen for measurements of surface-water flow during a period of low streamflows in September and October 1991 (fig. 1; table 1). Seven sites were required to define the quantity of surface water available to the diversions from Icicle and Snow Creeks, the water flow in the three diversions, the water supply to the hatchery from the Cascade Irrigation Canal, and the flow of Icicle Creek downstream from all diversions.

Site 2 on Icicle Creek was selected to quantify water flow at a point upstream from all diversions and most summer homes, and site 4 on Icicle Creek was selected to quantify water flow at a point downstream from those diversions and homes, but upstream from the hatchery. Site 2 is 0.4 mi upstream from Snow Creek at river mile 4.8 and is the site of a discontinued USGS streamflow data site (124580000), where 35 years of continuous streamflow record were collected from 1937-1971. Site 4 is located 1.3 river miles upstream from the hatchery.

Site 3 on Snow Creek was selected to quantify water flow in Snow Creek near its confluence with Icicle Creek. Site 3 is located where the Icicle-Peshastin Irrigation District Canal crosses over Snow Creek, 740 ft upstream from the mouth of Snow Creek.

Sites 5, 6, and 7 were selected to quantify the flow of water in each of the three diversions from Icicle Creek. Site 5 on the Icicle-Peshastin Irrigation District Canal is near the Snow Creek site, at the Snow Lakes trail footbridge. Site 6 on the City of Leavenworth diversion is inside the city water treatment plant at river mile 5.2. Site 7 on the common diversion for the fish hatchery and the Cascade Irrigation District is at river mile 4.5.

Site 8 on the Cascade Irrigation District Canal was selected to quantify the flow of water in the canal downstream from the hatchery diversion. Site 8 is at river mile 4.2, at a flume that splits Cascade Irrigation District water from the combined diversion with the fish hatchery. The difference between the discharges measured at sites 7 and 8 represents the amount of water diverted in a pipe to the hatchery.

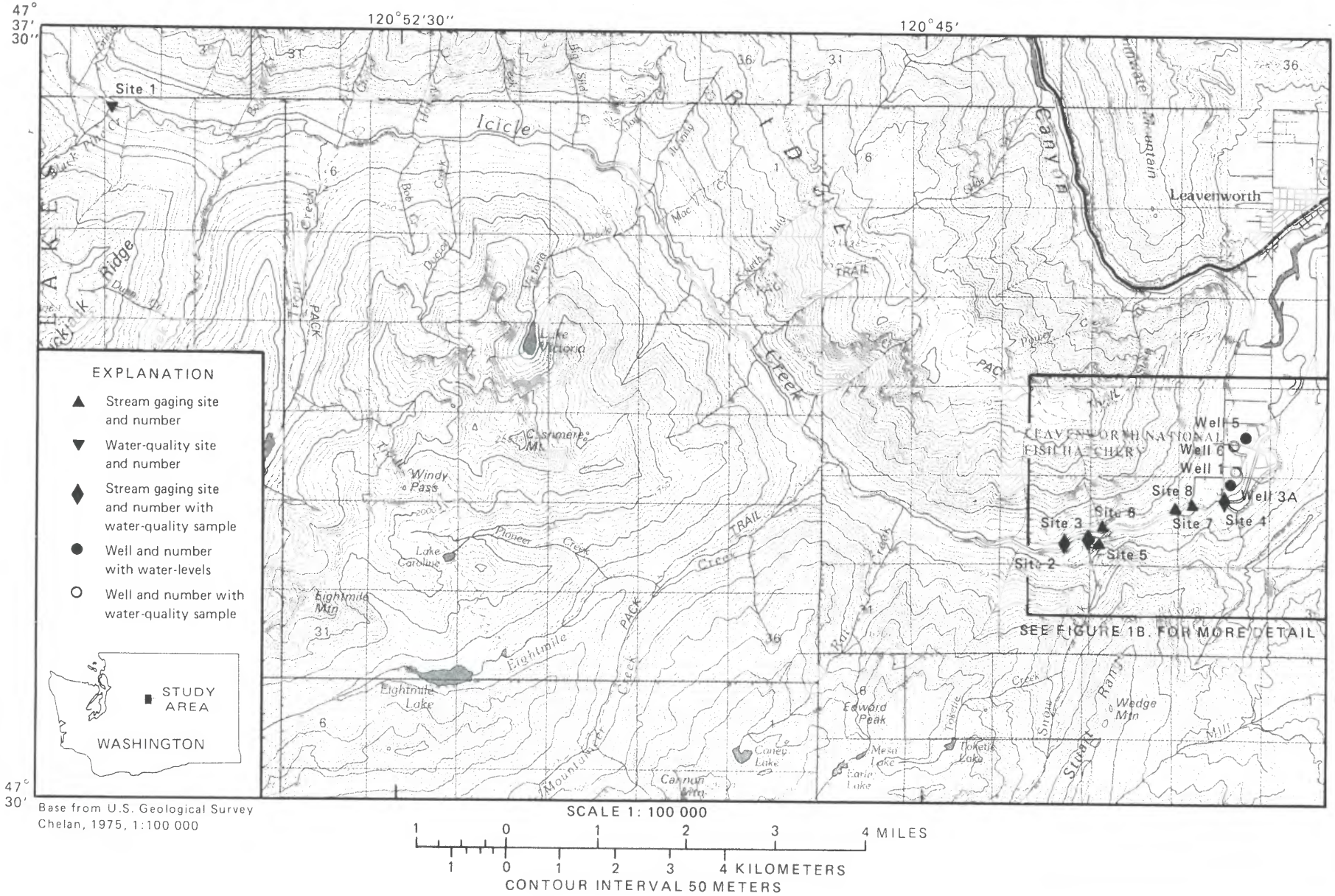
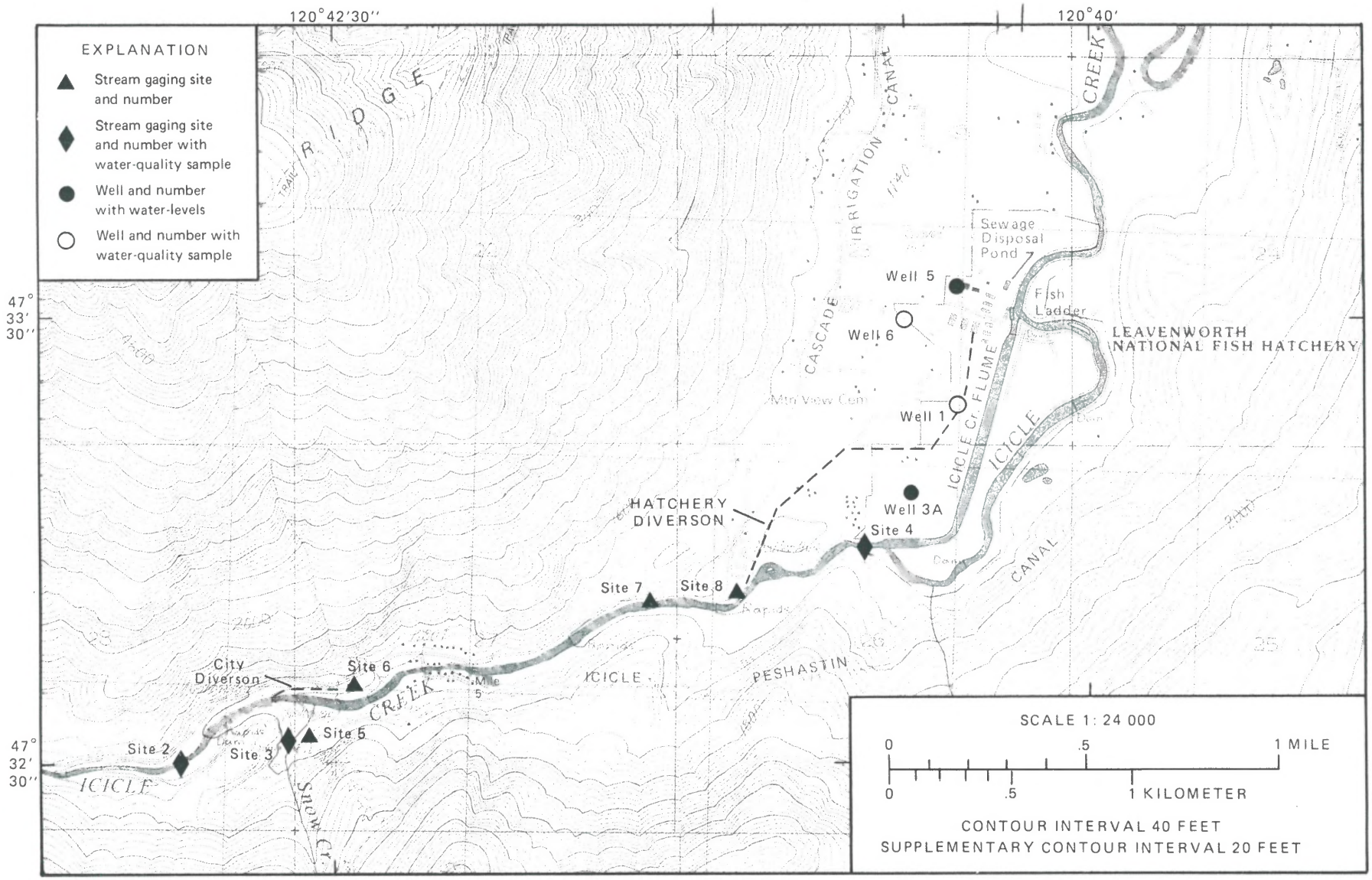


Figure 1A.--Location of study area and study sites.



Base from U.S. Geological Survey
Leavenworth, 1989, Provisional
Edition; Scale 1:24 000

Figure 1B.--Location of study area and study sites.

Surface-water quality was sampled at sites 2, 3, and 4 and at site 1 on Icicle Creek. Site 1 is upstream from Black Pine Creek, upstream from the most upstream Icicle Creek campground accessible by driving. It was chosen to represent generally pristine surface water. Sites 2 and 3 were chosen to represent surface-water quality upstream from diversions and summer homes, and site 4 was chosen to represent the water quality upstream from the hatchery and downstream from summer homes.

Two of the hatchery's approximately ten wells were selected for measurements to document depth from land surface to water (fig. 1, table 1). Hatchery well number 5 is a few yards west of the hatchery complex. Hatchery well number 3A is much closer to Icicle Creek, about 1/2 mi south, or upstream from the hatchery. Well number 5 was not pumped until October 1, and well number 3A was not pumped during the study period. These two wells were selected for measurement of ground-water levels because they were believed to represent generally static water levels at and upgradient from the hatchery during the time the wells were not being pumped.

Hatchery well numbers 1 and 6, one a shallow well and the other deep, were sampled for quality of ground water (fig. 1, table 1). Well number 1 is about 500 yd south, or upstream from the hatchery, and is drilled to about 77 ft. Well number 6 is located about 800 ft southwest of the hatchery and is drilled to a depth of 195 ft. Both wells were pumped for supplemental water supply to the hatchery on the days that the wells were sampled. These wells were selected for water-quality sampling because they were being purged by constant pumping and to determine any difference in water quality that could be associated with depth of well.

Table 1.--*Data collection sites and types of data collected*

[x, data collected; --, no data collected]

Site number	Site name	Latitude/ longitude identification number	Data Collected		
			Surface-water discharge	Ground-water level	Water quality
Gages					
1	Icicle Creek above Black Pine Creek	473648120564900	--		x
2	Icicle Creek above Snow Creek (12458000[1])	473228120430800	x		x
3	Snow Creek near mouth	473231120423900	x		x
4	Icicle Creek above hatchery	473259120404600	x		x
5	Icicle-Peshastin Irrigation District	473232120423700	x		--
6	City of Leavenworth	473241120422700	x		--
7	LNFH-Cascade Irrigation District[2]	473252120412800	x		--
8	Cascade Irrigation District	473253120411000	x		--
Wells					
1	Hatchery well (24N/17E-23Q01[3])	473305120400001		--	x
3A	Hatchery well (24N/17E-23K01[3])	473330120403701		x	--
5	Hatchery well (24N/17E-26B02[3])	473307120403600		x	--
6	Hatachery well (24N/17E-23K02[3])	473336120402800		--	x

[1]USGS site number

[2]LNFH is Leavenworth National Fish Hatchery

[3]Local well number

Well-Numbering System

In this report, in addition to hatchery well number, wells are also designated by local well numbers that indicate their location according to the rectangular-grid system for subdivision of public land (fig. 2, table 1). For example, in the local well number 24/17-23K01, the part before the hyphen indicates successively the township and range (T.24N., R.17 E.) north and east of the baseline and Willamette Meridian. Because all townships represented in this report are north of the baseline and east of the Willamette Meridian, the letters "N" and "E" are omitted in the local well number. The first number after the hyphen indicates the section (23) in which the well is located; the letter denotes the 40-acre subdivision of the section according to the diagram on figure 2. The last number is the serial number of the well in the 40-acre subdivision. Thus, well 24/17-23K01 is in the NE 1/4 SE 1/4 sec. 23, T.24N, R.44 E., and is the first well in that tract to be recorded.

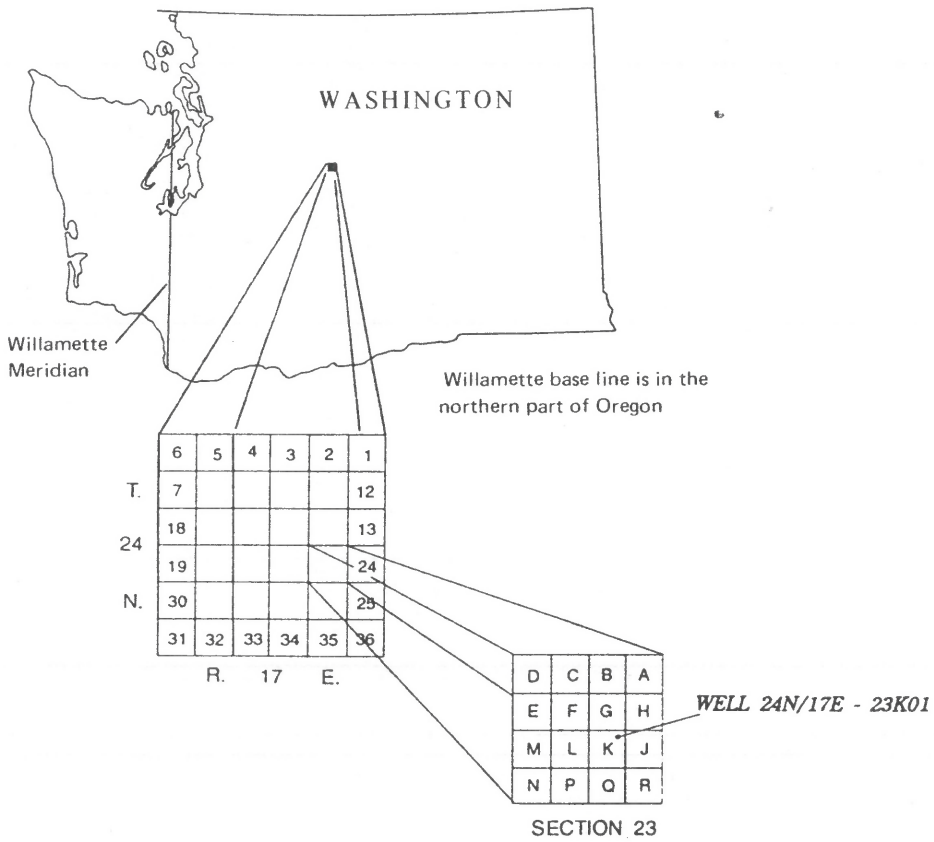


Figure 2.–Well-number system in Washington.

METHODS AND RESULTS OF DATA COLLECTION

Surface-Water Discharge

Surface-water flows were determined by direct measurement using standard USGS velocity meters and methods described in "Measurement and Computation of Streamflow" (Rantz and others, 1982). Where possible, the measurements were made at channel locations that had good hydraulic conditions--straight reaches with parallel streamlines, uniform streambeds with a minimum of boulders, uniform flow free of eddies and excessive turbulence, velocities greater than 0.5 ft/s, and depths greater than 0.5 ft. These ideal conditions did not always exist because of the rugged nature of this mountain stream, particularly at sites 2 and 3, where boulders and turbulence caused uneven velocity distribution.

Flows were measured at the seven surface-water sites (sites 2-8) on each of five visits during September-October, 1991 (fig. 3). One to three days was required to make the measurements at all seven sites. The measured discharges ranged from zero on some dates at diversion sites 5, 6, and 8 to 195 ft^3/s at site 2 on September 5, 1991. Measured discharge at site 2 decreased from 195 ft^3/s on October 10, while the measured discharge of site 3 decreased from 37.5 ft^3/s on September 5 to 31.8 ft^3/s on October 10. The discharges diverted from Icicle Creek upstream from the hatchery ranged from 0 to 83.6 ft^3/s for the five measurements in each of the three diversions.

For each visit to the sites in 1991, the flows measured at particular sites were added together to obtain either values of total streamflow available to the diversion network from Icicle and Snow Creek or the total water flow in the three diversions. In addition, flows at particular sites were subtracted to obtain either the residual difference between the total flows available and the total flow diverted, or the inflow to the hatchery. These calculated values are given in table 2. Calculated discharge available to the hatchery ranged from 41.2 to 45.2 ft^3/s during the study period. The residuals (total flow available minus total flow diverted) are directly comparable to the discharges measured at site 4 (Icicle Creek above hatchery) and serve as a measure of accuracy of measurements of flow at the sites. Notably, the measured discharges at site 4 are less than the residuals in September (as much as 14 percent less on September 4-6, 1991) and more than the residuals in October (as much as 11 percent more on October 10, 1991).

Surface-Water Quality

Samples of water from sites 1, 2, and 4 on Icicle Creek and site 3 on Snow Creek were collected on September 4 or 5 and September 26, 1991. All samples were collected, processed, and analyzed using standard USGS methods (Ward and others, 1990; Britton and Greeson, 1988; Fishman and Friedman, 1989). The surface-water-quality characteristics obtained from field measurements and laboratory analyses of the water sample at the four surface-water sites are listed in table 3.

Samples were collected using standard depth- and width-integrated methods. Suspended-sediment samples were collected with a DH-48 sampler. A DH-81 sampler was used for all other water constituents. Field measurements of temperature, specific conductance, and dissolved-oxygen concentration were made at four to five locations along the width of stream cross sections at the four sample sites on September 4 and 5, 1991, to determine uniformity of water quality along each cross section (table 4). The measured values varied little along the cross sections.

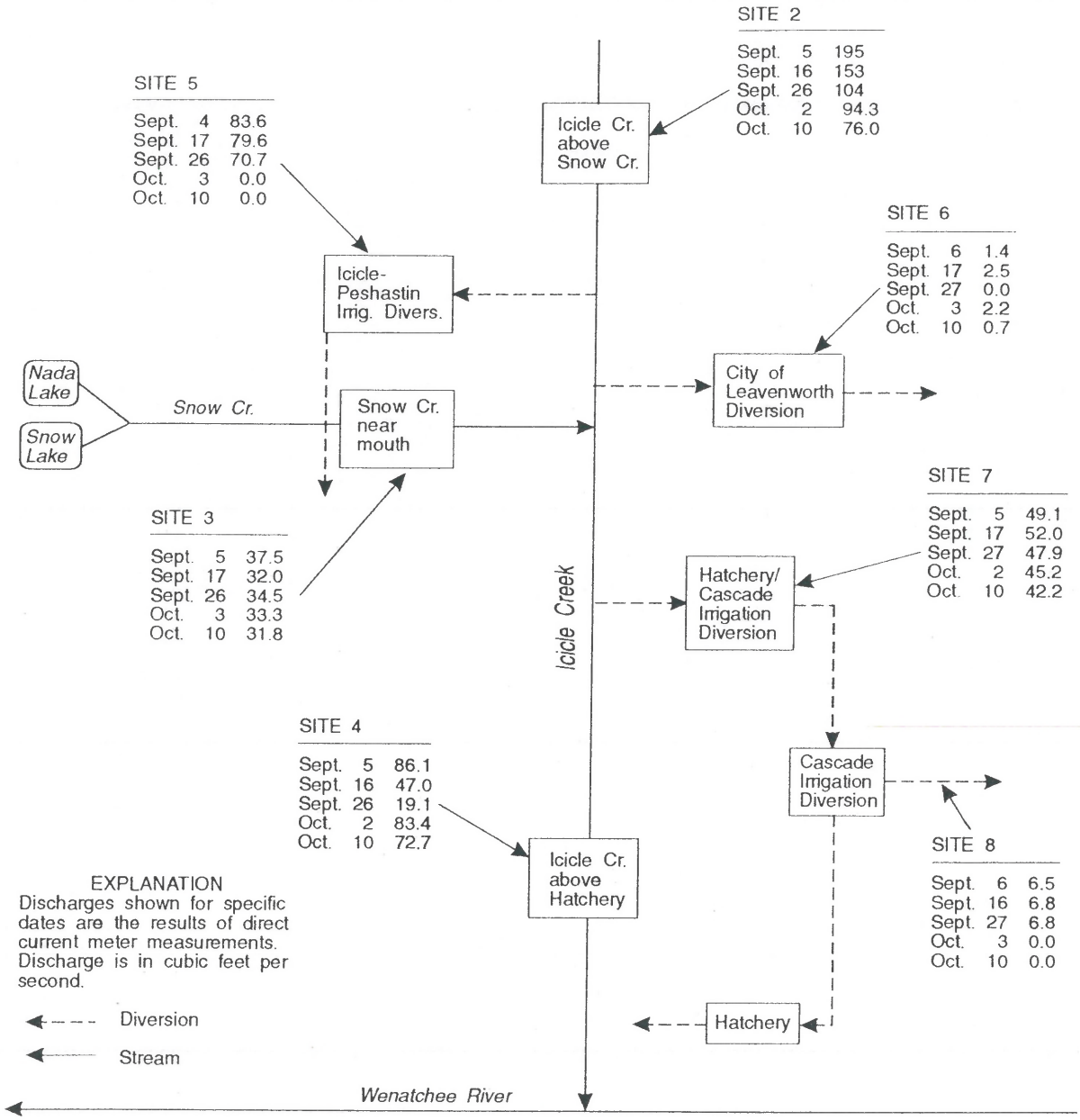


Figure 3.--Schematic showing the surface-water flow network and measurements of surface-water discharges, September 4 through October 10, 1991.

Table 3.--*Water-quality measurements*

[µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; cols./100 mL, colonies per 100 milliliters; <, less than; --, not measured]

Site number	Site name	Date	Temperature water (degree Celsius)	Specific conductance (µS/cm)	Oxygen dissolved (mg/L)	Oxygen dissolved (percent saturation)	pH (standard units)	Nitrogen NO_2+NO_3 dissolved (mg/L as N)	Phosphorus ortho, dissolved (mg/L as P)	Chloride, dissolved (mg/L as Cl)	Boron dissolved (µg/L as B)	Methylene blue active substance (mg/L)	Coliform fecal, 0.7 (cols./100 mL)	Streptococci fecal, (cols. per 100 mL)
1	Icicle Creek above Black Pine Creek	09-04-91	12.5	33	9.6	98	7.7	<0.05	<0.01	0.30	<10	0.01	--	--
		09-26-91	9.0	42	--	--	7.7	--	--	--	--	--	[1]3	53
2	Icicle Creek above Snow Creek	09-05-91	14.5	44	9.7	100	7.9	0.05	<0.01	0.20	<10	<0.01	--	--
		09-26-91	13.5	60	--	--	7.9	--	--	--	--	--	[2]<1	20
3	Snow Creek near mouth	09-05-91	10.5	10	10.7	100	7.0	<0.05	<0.01	<0.10	<10	0.01	--	--
		09-26-91	11.0	10	--	--	7.4	--	--	--	--	--	[2]<1	39
4	Icicle Creek above hatchery	09-05-91	15.5	36	9.7	101	7.8	<0.05	<0.01	0.20	<10	0.01	--	--
		09-26-91	14.0	38	--	--	7.8	--	--	--	--	--	[1]3	[1]19
Well 1 (shallow, 77 feet)	24N/17E-23Q01	09-06-91	7.5	68	9.7	84	7.3	<0.05	<0.01	0.30	<10	0.01	--	--
		09-27-91	7.5	77	--	--	7.4	--	--	--	--	--	[2]<1	[1]1
Well 6 (deep, 195 feet)	24N/17E-23K01	09-06-91	10.0	126	6.0	55	7.9	0.54	<0.01	1.1	50	0.01	--	--
		09-27-91	9.0	142	--	--	7.9	--	--	--	--	--	[2]<1	[1]<1

[1]Average count of several samples based on non-ideal colony count (ideal count is 20-60 colonies for fecal coliform and 20- 100 colonies for fecal streptococci per 100 mL sample)

[2]Maximum estimated number (actual count was zero)

Table 4.--*Water-quality characteristics along stream cross sections*

[Measurements of water-quality characteristics were spaced evenly along a stream cross section to represent equal discharge increments within the width of the cross section; µScm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter]

Site number	Site name	Date	Temperature water (degrees Celsius)	Specific conductance (µS/cm)	Oxygen, dissolved (mg/L)	Oxygen, dissolved (percent saturation)
1	Icicle Creek above Black Pine Creek	09-04-91	12.5	33	9.6	98
		09-04-91	12.5	32	9.6	98
		09-04-91	12.5	32	9.6	98
		09-04-91	12.5	32	9.5	97
		09-04-91	12.5	32	9.4	96
2	Icicle Creek above Snow Creek	09-05-91	14.5	44	9.6	99
		09-05-91	14.5	45	9.7	100
		09-05-91	14.5	45	9.8	101
		09-05-91	14.5	45	9.6	99
		09-05-91	14.5	45	9.6	99
3	Snow Creek near mouth	09-05-91	10.5	10	10.8	101
		09-05-91	10.5	10	10.7	100
		09-05-91	10.5	10	10.7	100
		09-05-91	10.5	10	10.7	100
4	Icicle Creek above hatchery	09-05-91	15.5	36	9.6	100
		09-05-91	15.5	36	9.7	101
		09-05-91	15.5	36	9.7	101
		09-05-91	15.5	36	9.7	102

Ground-Water Levels

Depth from ground level to water was measured at wells 3A and 5 during the period from September 6 through October 10, 1991 (table 5). Well 3A was not pumped during the study. Well number 5 had not been pumped for several weeks prior to the start of the study, but was pumped continuously after October 1. For well number 5, measurements after pumping started are not included in table 5. The measurements of depth to water indicate that water levels generally declined about 1 ft from September 6 through September 27, and then increased about 1 ft by October 10, 1991. The decline and increase in ground-water levels generally corresponds with a decline and increase in the flow of Icicle Creek at site 4.

Table 5.--*Measurements of depth to water at hatchery wells 3A and 5*

Site number	Land surface altitude (feet)	Well depth (feet)	Date water-level measured	Depth to water (feet)
Well 3A	1,140	92	09-06-91	29.68
			09-17-91	30.68
			09-27-91	31.16
			10-02-91	30.05
			10-10-91	30.20
Well 5	1,140	279	09-17-91	22.84
			09-27-91	23.00

Ground-Water Quality

The water-quality characteristics for ground water at wells no. 1 and 6 are given along with the surface-water-quality characteristics in table 3. These samples were obtained on September 6 and 27, 1991, from a faucet or spigot on the two wells while the wells were being pumped to supply supplemental water to the fish hatchery. Standard USGS methods (Britton and Greeson, 1988; Fishman and Friedman, 1989) were used for analyzing all samples. The ground-water samples were all analyzed for the same constituents as the surface-water samples.

Ground-water temperatures were lower (7.5°C) on September 6 and 17 in the shallower well (well no. 1) than the deeper well. The deeper well (well no. 6), had temperatures (9.0 to 10.0°C) similar to the surface-water sites. Specific conductances were notably higher in the wells than in Icicle Creek, measuring 68 and 126 µS/cm on September 6, and 77 and 142 µS/cm on September 17, at wells no. 1 and 6, respectively. Dissolved-oxygen concentration and pH values in the wells were generally in the range of those observed in Icicle Creek, although dissolved-oxygen concentration in the deeper well no. 6 was notably less (6.0 mg/L and 55 percent saturation) than in Icicle Creek (9.6-9.7 mg/L and 98 to 101 percent saturation). Bacteria counts were 1 or fewer colonies per 100 mg/L of sample in both wells on September 27, 1991.

SELECTED REFERENCES

Britton, L.J. and Greeson, P.E. (eds), 1988, Methods for collecting and analysis of aquatic biological and microbiological samples: U.S. Geological Survey Techniques of Water-Resources Investigations, Book 5, Chapter A4; Open-File Report 88-190, 685 p.

Fishman, M.J., and Friedman, L.C. (eds), 1989, Methods for determination of inorganic substances in water and fluvial sediments: U.S. Geological Survey Techniques of Water-Resources Investigations, Book 5, Chapter A1, 545 p.

Rantz, S.E., and others, 1982, Measurement and computation of streamflow: Volume 1, Measurement of stage and discharge: U.S. Geological Survey Water-Supply Paper 2175, 284 p.

Tabor, R.W., and others, 1987, Geologic map of the Chelan 30-minute by 60-minute quadrangle map, I-1661, scale 1:100,000.

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ATT VI

ATT VI

HATCHERY PRODUCTION SUMMARY (Intensive Culture)

Station: Leavenworth NFH			Period Covered: October 1, 1999 through September 30, 2000							
Species / Strain and Lot Number	Fish on Hand Last Day of Period					To Date This Fiscal Year				
	Number	Weight	Length	D.I.	F.I.	Weight Gain	Feed Expended		Conversion	Percent Survival
							Pounds	Costs		
1	2	3	4	5	6	7	8	9	10	11
SCS/WEN/96/LEV/54	0	0	0			24,447	39,334	16,271	1.61	95
SCS/WEN/98/LEV/57	1,660,700	75,728	5.0	0.12	0.81	74,565	77,734	42,266	1.04	98
Totals / Averages	1,660,700	75,728				99,012	117,068	58,537	1.18	97

FIVE YEAR HATCHERY PRODUCTION SUMMARY

Station:Leavenworth NFH

	Fiscal Year				
	2000	1999	1998	1997	1996
I. Fish Production Data					
Intensive Culture:					
Fish Weight (pounds)	104,972	111,325	61,193	88,600	70,486
Fish Numbers (x 100)	1,660.700	1,741.700	1,711.700	1,751.700	1,056.000
Percent Survival	97.5	98.0	96.0	98.0	97.7
Feed Conversion	1.12	1.10	1.62	1.22	1.30
Extensive Culture:					
Fish Weight Gain (pounds)					
Fish Numbers					
Percent Survival					
Pounds per Acre					
II. Broodstock Production					
Number of Females Spawned	487	471	470	500	497
Number of Eggs	1,907,000	2,263,000	2,263,000	2,100,000	1,740,000
Number of Fish	4,457	1,745	1,541	2,839	1,148
III. Management Data:					
Full Time Equivalents	19.25		15.5	15	15
Operational Costs	1,232,811		1,124,419	1,019,000	844,000
Vehicle/Equip. Cost > $1000	22,637		77,459	81,727	41,024
Cyclical Maintenance Costs	43,500		82,646	6,386	101,053
Quarters Costs	16,454		14,717	15,909	18,403

Form 3-115 (Rev. 1/89)

FIVE YEAR HATCHERY PRODUCTION SUMMARY

Station:Leavenworth NFH

	Fiscal Year				
	2000	1999	1998	1997	1996
I. Fish Production Data					
Intensive Culture:					
Fish Weight (pounds)	104,972	111,325	61,193	88,600	70,486
Fish Numbers (x 100)	1,660.700	1,741.700	1,711.700	1,751.700	1,056.000
Percent Survival	97.5	98.0	96.0	98.0	97.7
Feed Conversion	1.12	1.10	1.62	1.22	1.30
Extensive Culture:					
Fish Weight Gain (pounds)					
Fish Numbers					
Percent Survival					
Pounds per Acre					
II. Broodstock Production					
Number of Females Spawned	487	471	470	500	497
Number of Eggs	1,907,000	2,263,000	2,263,000	2,100,000	1,740,000
Number of Fish	4,457	1,745	1,541	2,839	1,148
III. Management Data:					
Full Time Equivalents			15.5	15	15
Operational Costs			1,124,419	1,019,000	844,000
Vehicle/Equip. Cost > $1000			77,459	81,727	41,024
Cyclical Maintenance Costs			82,646	6,386	101,053
Quarters Costs			14,717	15,909	18,403

Form 3-115 (Rev. 1/89)